

Claims

- [c1] A system for thermoforming a polymer sheet, comprising:
- a mold having a predetermined shape;
 - a platen including a flexible web for supporting the polymer sheet adjacent said mold, said platen being movable toward said mold for stretching said web over and covering said mold surface to thereby engage said sheet with said mold; and
 - a heat generating source for heating the polymer sheet so that it softens to conform to said mold shape.
- [c2] The system as set forth in claim 1, further including:
- a coating composition for coating the polymer sheet to facilitate release of the sheet from said platen.
- [c3] The system as set forth in claim 1, wherein said polymer sheet further includes a surface protecting laminate.
- [c4] The system as set forth in claim 1, further including:
- a second platen in spaced relation to said platen supporting the polymer sheet, said second platen including a second flexible web and being movable toward said mold for stretching said second web over and urging said polymer sheet into conformance with said mold.
- [c5] The system as set forth in claim 1, wherein said flexible web further comprises:
- a first, stretchable, mold contacting layer;
 - a second, polymer sheet contacting layer; and
 - said first layer having a greater modulus of elasticity than said second layer.
- [c6] The system as set forth in claim 4, wherein said heat generating source is mounted for reciprocal positioning over said polymer sheet.
- [c7] The system as set forth in claim 2, wherein said coating composition exhibits non-stick characteristics with respect to a contacting surface of said sheet.

[c8] The system as set forth in claim 7, wherein said coating composition is capable of resisting thermoforming temperatures of up to at least about 450 ° F.

[c9] The system as set forth in claim 2, wherein said coating composition is an essentially water free mixture comprising:
silicone; and
organic solvents.

[c10] The system as set forth in claim 9, wherein said coating composition further includes silica.

[c11] A method of thermoforming a polymer sheet, comprising the steps of:
positioning a polymer sheet on a stretchable web supported by a platen positioned in spaced relation to a mold;
heating the polymer sheet to a thermoformable temperature; and
lowering said platen over said mold to effectively engage said sheet with said mold to thereby enable said polymer sheet to conform to said mold.

[c12] A method of thermoforming as set forth in claim 10, further including the step of:
coating the polymer sheet with a heat resistant non-stick composition.

[c13] A method of thermoforming as set forth in claim 12, wherein said polymer sheet further includes a surface protecting laminate.

[c14] A method of thermoforming as set forth in claim 13, wherein said non-stick coating comprises a solution including a solvating quantity of an organic solvent mixed with a quantity of a polymer selected from the group consisting essentially of silanes, silicones, siloxane, acrylic resins, polytetrafluoroethylene, epoxies, polyesters, urethanes, allyl resins, amino resins, phenolic resins.

[c15] A method of thermoforming as set forth in Claim 13, wherein said non-stick

coating comprises a ceramic material.

[c16] A method of thermoforming as set forth in claim 12, wherein said heat resistant coating composition is selected from the group consisting of high temperature coating composition sold under the trademark PITT-THERM ® .

[c17] A method of thermoforming as set forth in claim 11, further including the step of:
after step (c), lowering a second movable platen toward said sheet for urging said sheet in conformance with said mold.

[c18] A method of thermoforming as set forth in claim 11, further including the steps of:
after step (c), waiting until said polymer sheet conforms to said mold;
and
removing said formed polymer sheet from the mold.

[c19] A method of thermoforming a polymer sheet having a surface protecting laminate, comprising the steps of:
coating the polymer sheet with a heat resistant non-stick composition;
positioning the coated polymer sheet on a stretchable web supported by a platen positioned in spaced relation to a mold;
heating the coated polymer sheet to a thermoformable temperature;
lowering said platen over said mold to effectively engage said sheet with said mold to thereby enable said polymer sheet to conform to said mold;
lowering a second stretchable web supported by a platen toward said sheet for urging said sheet into conformance with said mold;
waiting until said polymer sheet conforms to said mold; and
removing said formed polymer sheet from said mold.

[c20] A protectively masked thermoformable polymer composition, comprising:
a thermoformable polymer sheet having a first surface and an opposite second surface;

first and second polymer laminate layers coupled with said respective first and second surfaces; and
first and second heat resistant, non-stick coatings bonded to said first and second polymer laminate layers.

[c21] The thermoformable polymer composition as set forth in claim 20, wherein:
said non-stick coating includes a mixture of silicone and organic solvents.

[c22] The thermoformable polymer composition as set forth in claim 20, wherein
said heat resistant coating is selected from the group consisting of high temperature coating composition sold under the trademark PITT-THERM ® .

[c23] The thermoformable polymer composition as set forth in claim 20, wherein
said heat resistant coating comprises a solution including a solvating quantity of an organic solvent mixed with a quantity of a polymer selected from the group consisting essentially of silanes, silicones, siloxane, acrylic resins, polytetrafluoroethylene, epoxies, polyesters, urethanes, allyl resins, amino resins and phenolic resins.

[c24] The thermoformable polymer composition as set forth in claim 20, wherein
said non-stick coating comprises a ceramic material.